

Technology Transfer and Cooperation in Research

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Technology Transfer in the United States: 25 years later..

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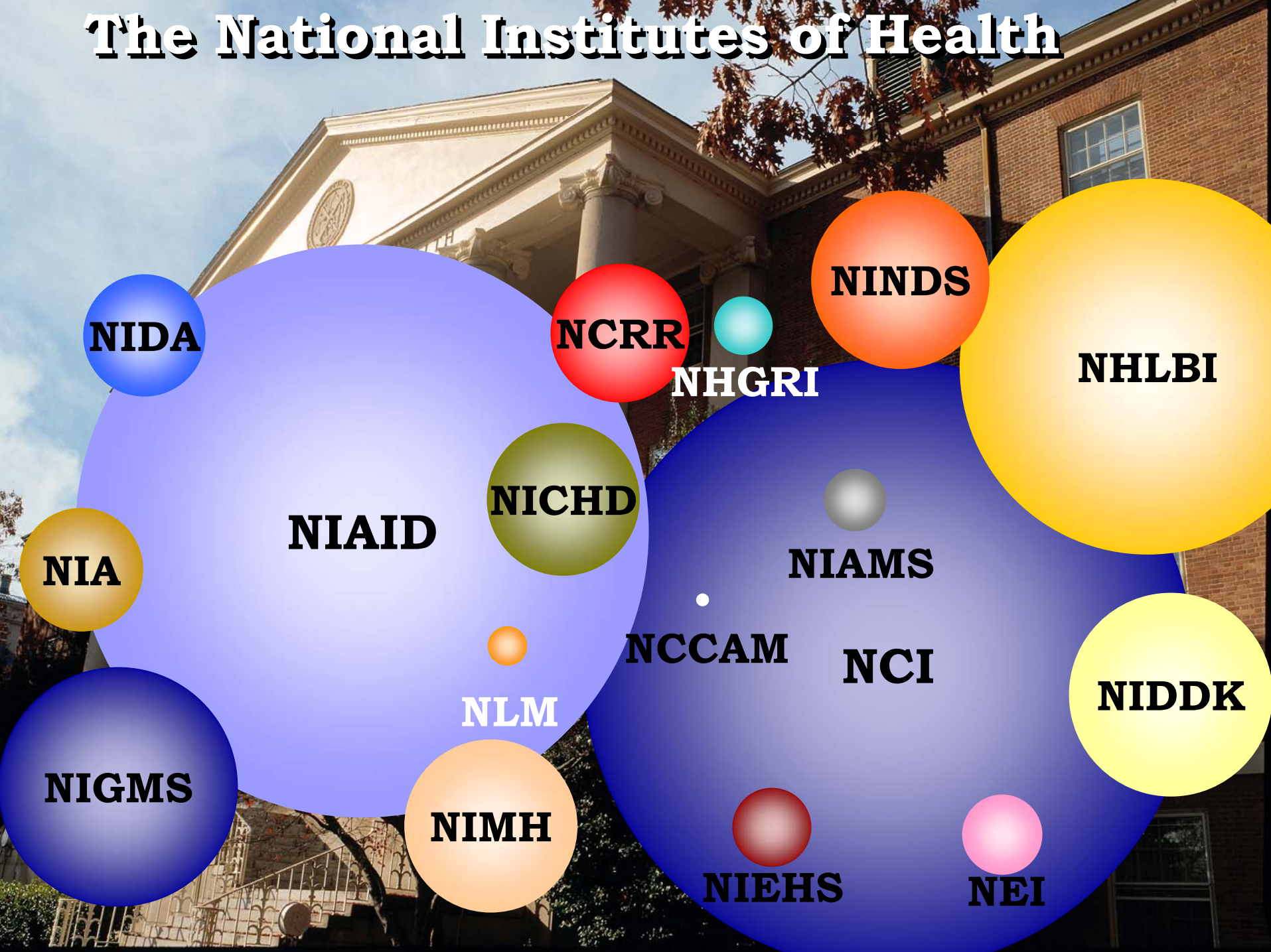
Office of Technology Development
National Institute of Allergy and Infectious Diseases
National Institutes of Health, Bethesda, Maryland



National Institutes of Health

- **Annual budget of \$ 28.8 billion (2006)**
- **10% of funding for intramural research**
- **4,500 doctoral scientists / 19,000 staff**
- **Approximately 2000 Research Projects**
- **38,000 grantee investigators**
- **Basic & clinical research discoveries**
- **Manufacture of products with Industry**
- **Technology transfer staff of ~150**

The National Institutes of Health



National Institutes of Allergy and Infectious Diseases



NIAID

- HIV / AIDS
- Avian Flu
- Malaria
- TB
- Dengue, WNV
- Enteric Diseases
- Transplantation
- Sexually Transmitted Diseases
- Asthma and Allergic Diseases
- Vaccine Development

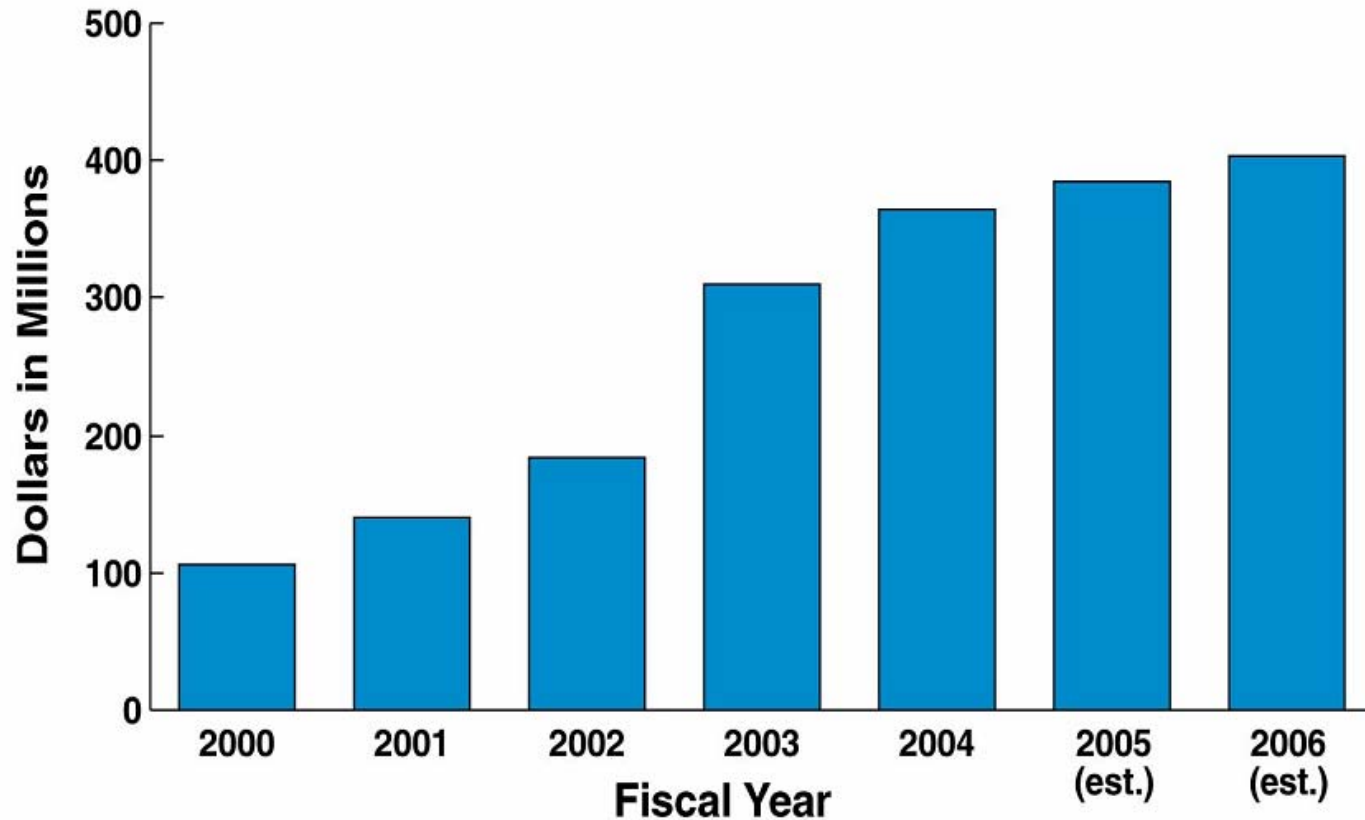


Examples of NIAID Activities

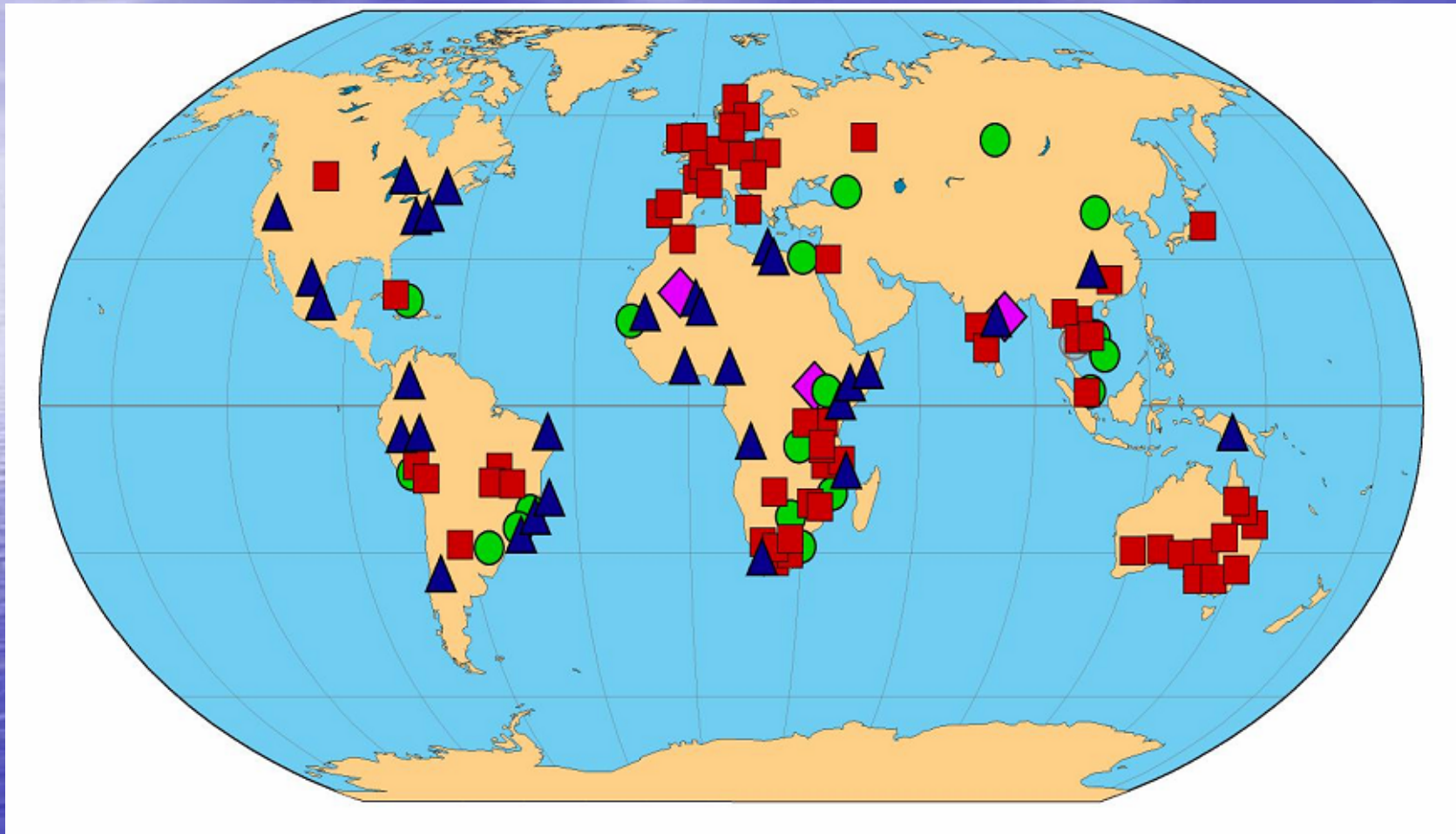
- Promoting International Research
- Interactions with Industry
- Resources for Research
- Expanding knowledge base
- Clinical Research
- Product development



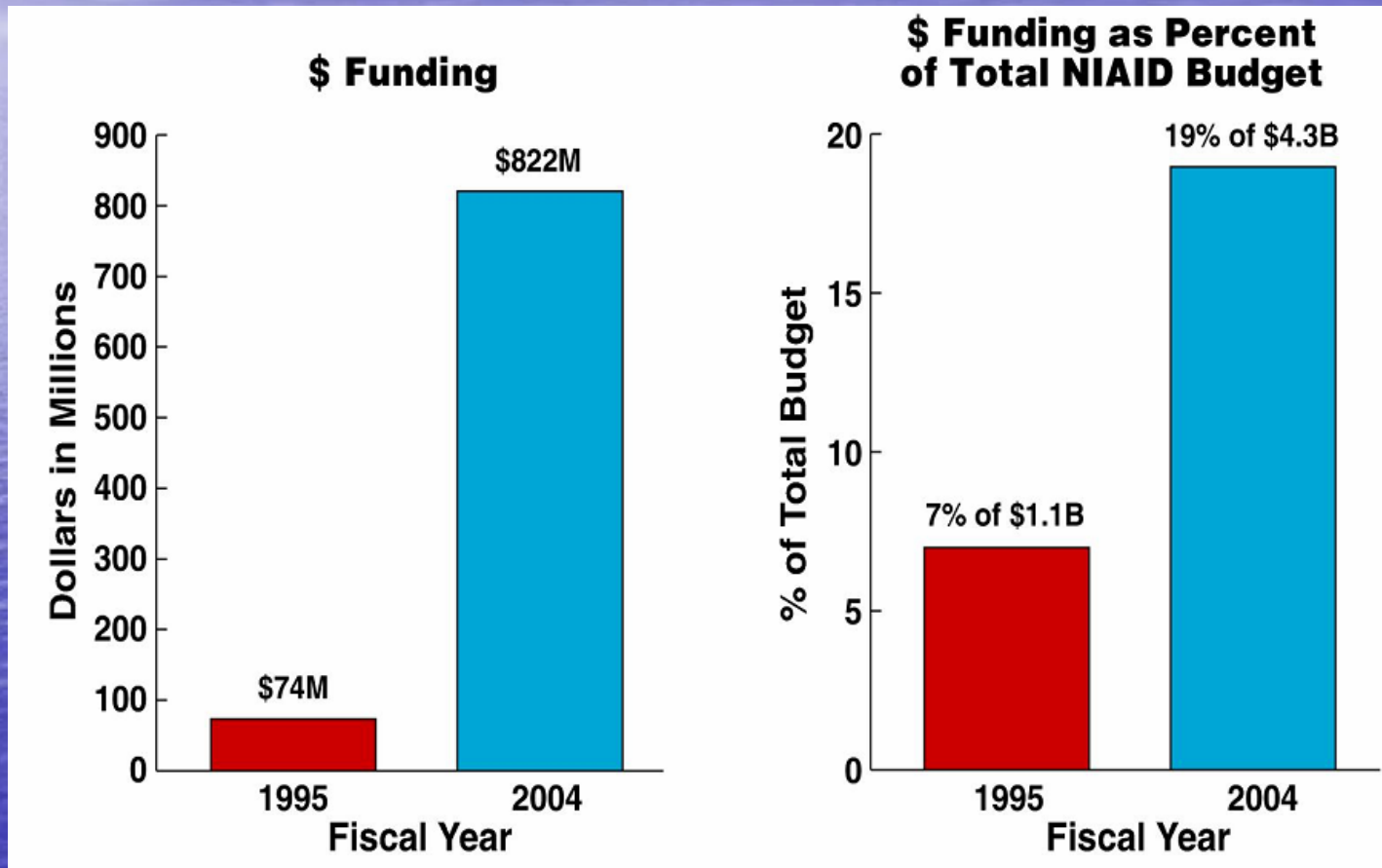
NIAID: Funding for projects outside the US



NIAID: International Research Networks



NIAID Awards to the Private-Sector 1995 vs. 2004



“Technology Transfer is the process by which technology developed by one organization, in one area or for one purpose is applied in another organization, in another area or for another purpose.”



TT Works!

- **Licenses**
- **Royalty**
- **Patents**
- **Economic Development**
- **Growth of new industry**
- **Availability of New Technology**

“The Federal investment in science has yielded stunning payoffs. It has spawned not only new products, but also entire industries”

Source: *Unlocking Our Future*:. 1998. A Report to the US Congress.



Intramural NIH Technology Transfer

- **App. 400 new invention reports/yr.**
- **Over 2,000 patents**
- **Over 1,300 active licenses**
- **Nearly 200 technologies in the market**
- **\$98 million royalty income FY2005**
- **Over 84% licenses are non-exclusive**
- **About 14% licenses with non-US firms**
- **Over 52% licenses with small companies**



Benefits of TT in the US

- **450 new companies were formed in 2002 based on University research. Since 1980 - 4,320 companies have been formed**
- **2,076 new products have been created by university researchers**
- **Universities and their scientists received \$ 1.3 billion in 2002 from technology transfer activities (3.6% of total funding)**
- **260,000 new high paying jobs created (1999 Survey)**
- **40 Billion added to US economy (1999 Survey)**

Source AUTM survey 2002,1999



TT as it is practiced today grew out of a unique set of conditions in the United States in the 70s and 80s

- **Change in funding trends for research**
- **Faster pace of commercialization**
- **Increasing foreign economic competition**
- **Dissatisfaction with use of govt. owned inventions**



These circumstances led to series of events in the 80's that revolutionized TT in the US

- **New Laws for TT**
- **Strengthening of Patent Laws**
- **Emergence and Maturing of Research Based Industries (Biotechnology in particular)**



US Legislation Regarding Technology Transfer

- Bayh-Dole University and Small Business Patent Act (1980)
- Stevenson-Wydler Technology Innovation Act (1980)
- Small Business Innovation Development Act (1982)
- National Cooperative Research Act (1984)
- Federal Technology Transfer Act (1986)
- Omnibus Trade and Competitiveness Act (1988)
- National Competitiveness Technology Transfer (1989)
- National Cooperative Research and Production Act (1993)
- Technology Transfer Commercialization Act (2000)



University Research: Bayh-Dole Act (1980)

- Allowed Universities to take ownership of inventions arising from government funded research.
- In 1987 Regulations were issued to Universities (37 CFR 401) (www4.law.cornell.edu/cfr/37p401.htm).
 - Pursue patents
 - University must require its staff to disclose inventions (written agreements)
 - Must disclose invention within 2 months to government agency
 - If university decides to keep invention, it must file a patent application before rights are lost
 - Universities must share with the inventor a share of the income from licensing of inventions
 - US Government gets a royalty free license to all govt. funded inventions



Grantee invention reports are highly time sensitive and require tracking of many independently timed events

Some Examples:

- Implement Employee Agreements ⇒ **at employment**
- Disclose Each Invention ⇒ **within 60 days**
- Resolve Election or Waive Title ⇒ **within 2 years**
- File Patent ⇒ **within 1 yr. of election**
- **Need for a Technology transfer /patent office**

Details at:

<https://s-edison.info.nih.gov/iEdison/nihprocs.jsp>



The US model of Technology Transfer : Impact of New Laws

“Possibly the most inspired piece of legislation to be enacted in America over the past half-century was the Bayh-Dole Act of 1980.”

Source: The Economist. “Innovation’s Golden Goose” Dec 12, 2002

“Taking inspiration from the United States, nearly all other OECD countries have reformed research funding regulations or employment laws to allow research institutions to file, own and license the IP generated with public research funds.” Prominent among these are Germany, Austria, Denmark, Norway, Japan and Korea.

See: OECD report “Turning Science into Business: Patenting and Licensing at Public Research Organizations 2003”



US Government Research: Stevenson-Wydler Technology Innovation Act (1980)

- Made it part of the mission of US govt. agencies and their labs to transfer technology to the private sector and other research organizations
- Regulations to government labs ensure that:
 - Government Labs must set up a TT office
 - Labs must set aside funds for patenting
 - Duty of government scientists to disclose inventions
 - Income from patents must be shared with inventors – share of royalty set by law
 - May enter into formal research collaborations agreements involving exchange of funds and or intellectual property with industry and other entities



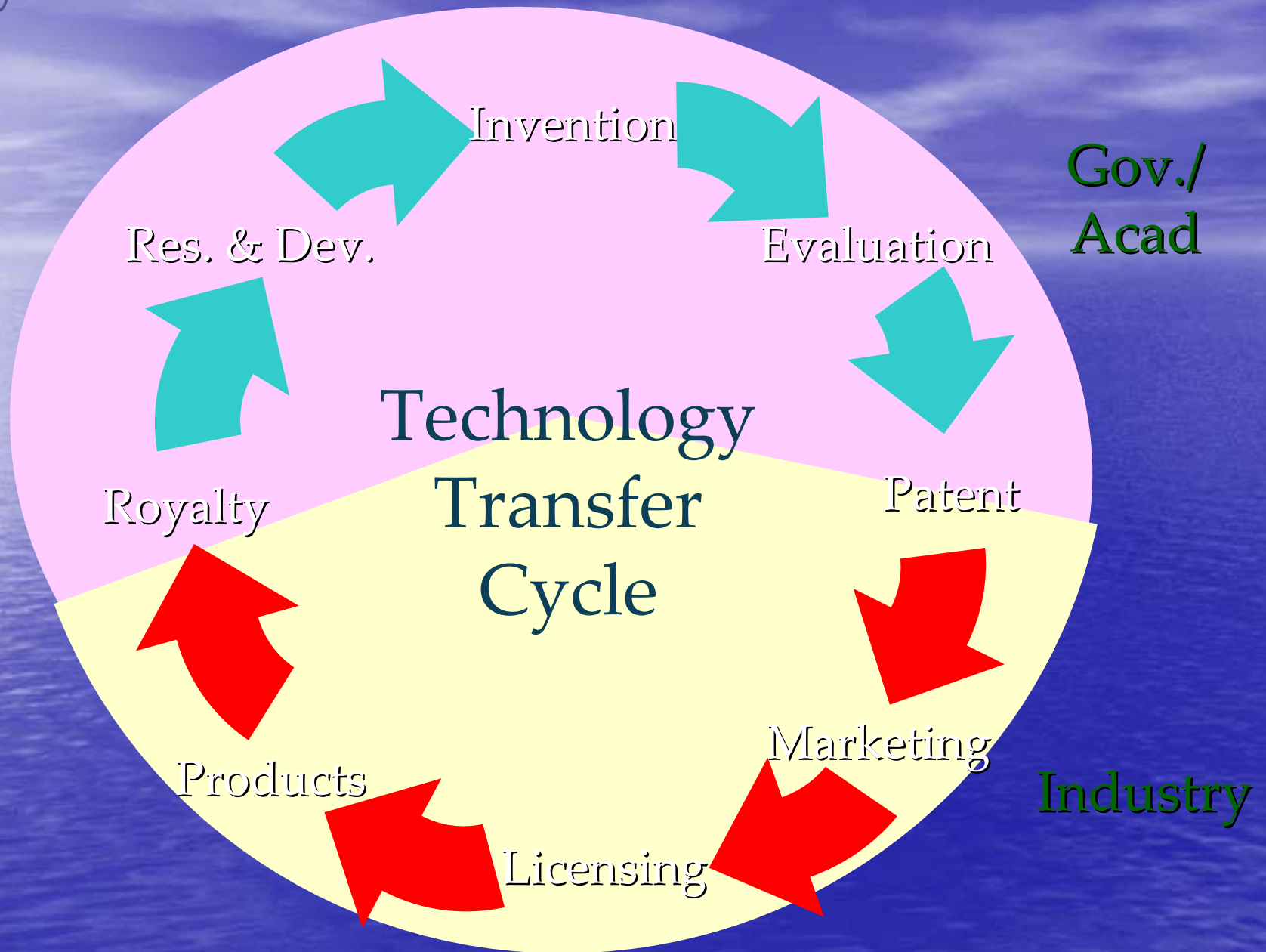
Two major Mechanisms to Transfer Technology

- Patenting and Licensing of new inventions
- Developed Technology

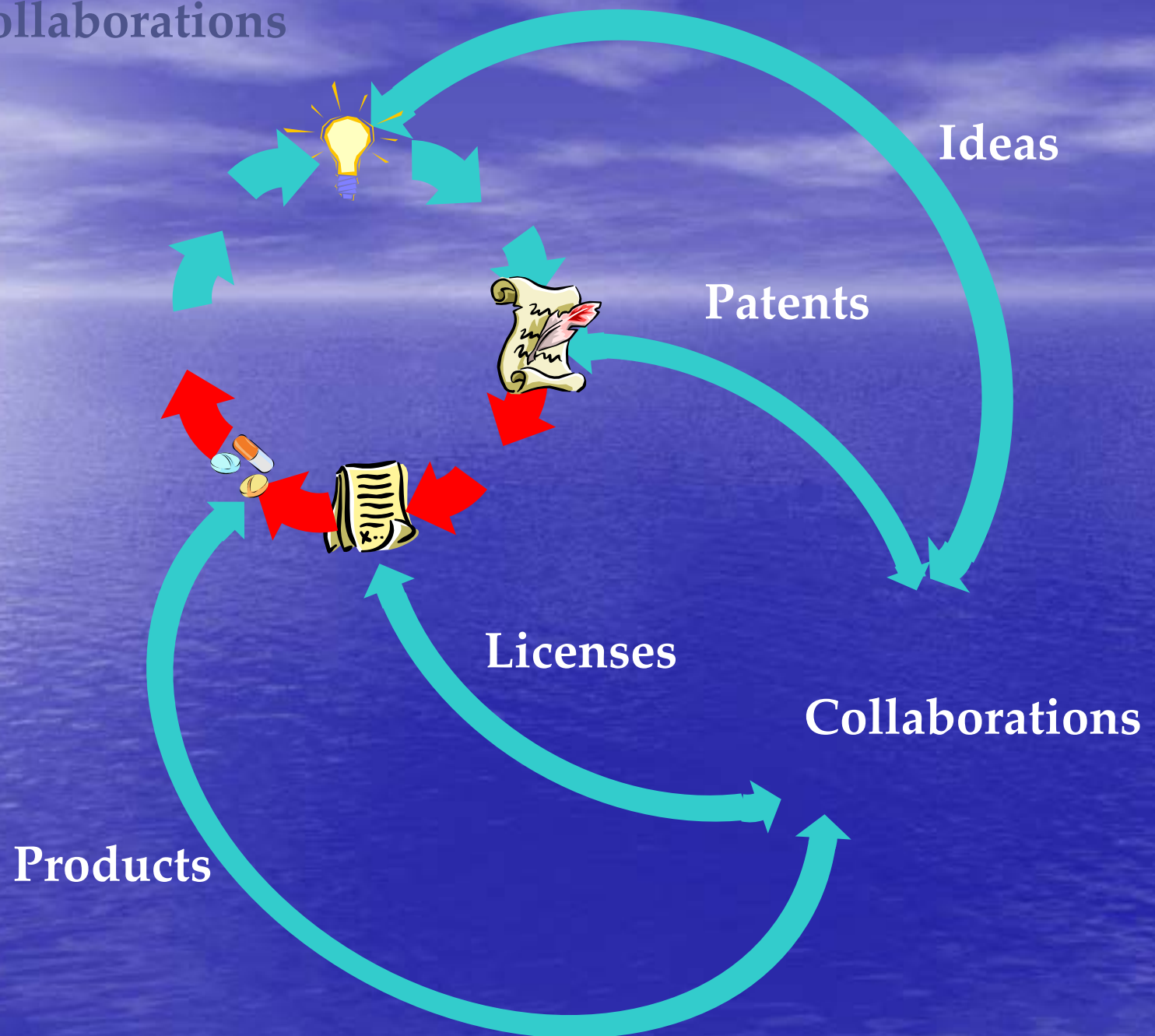


- Research Collaborations
 - Formal
 - Informal
- Early stage technology that needs cooperation to develop





TT in Collaborations



Research Collaborations

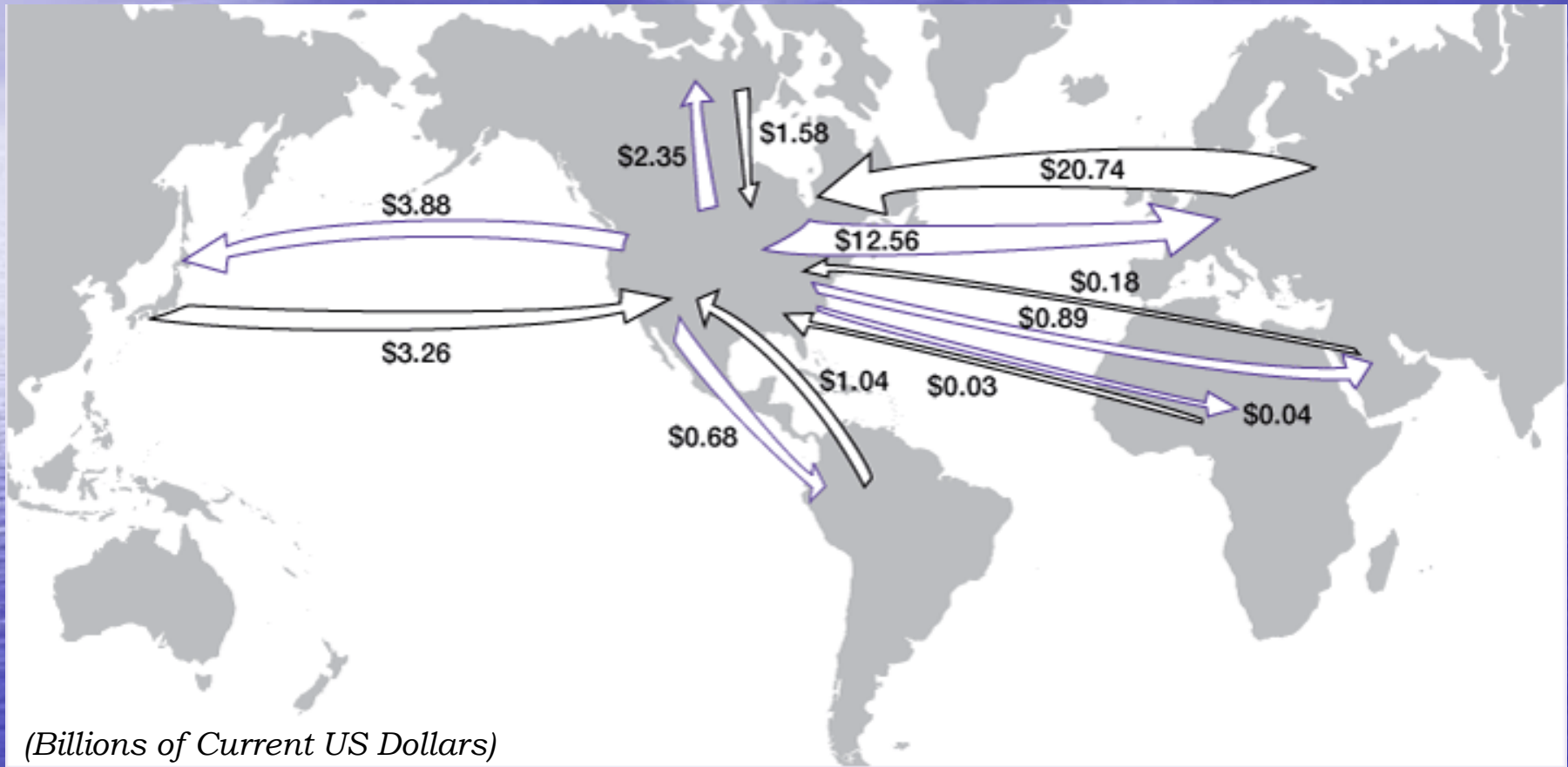
“Today’s science and technology enterprise is more like an ecosystem than a production line. Fundamental science and technological advances are interdependent,”



Science in the National Interest. 1994. Washington, DC: Office of Science and Technology Policy.



Research is increasingly collaborative and global: Flow of R&D Funds overseas (2002)



Source: National Science Foundation, *Science and Engineering Indicators 2006*



Informal Research Collaborations

- Exchange of Materials
- Scientist to scientist contact,
 - Long Stays
 - Short term visits
 - Presentation at international meetings
- Publication
(peer recognition)
- International grants and programs

"Although science is believed by many to be a largely individual endeavor, it is in fact often a collaborative effort. In forging collaborations, scientists often work without concern for international boundaries. Most international scientific collaborations take place on the level of individual scientists or laboratories"

Unlocking Our Future. 1998. A Report to the US Congress.



Formal research collaboration

- Why formal research collaboration?
- Expectations clarified and codified:
 - Defined research plan
 - Exchange and origins of Materials
 - Confidentiality
 - Intellectual property – protection and management
 - Institutional policies, goals and legal constraints
- Examples: Material Transfer Agreements, Clinical Trial Agreements, inter-institutional and international agreements, sponsored research agreements, etc.



Why should **YOU** bother with TT?

- Address and avoid potential disputes related to IP
- Fulfill obligations to your institution and granting agency
- Gain an insider look at how companies do research and development (pre-requisite for working with private sector)
- Access to scientific, regulatory and commercial development expertise
- Access to new technology
- The “satisfaction factor”: Your hard work transformed into a useful product



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